

SKYLINE32 Instruction Manual^{v1.2}

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Feature

1. Dimensions : SKYline32(35mm×35mm×5mm) (1378mil×1378mil×197mil) , SKYline32 MINI(30mm×16mm×7.5mm) (1181mil×630mil×295mil)
2. Weight: SKYline32 (Acro 4.8g, Advanced 5.4g) (Acro 0.169oz, Advanced 0.190oz) , SKYline32 MINI (Acro 2.5g, Advanced 2.6g) (Acro 0.088oz, Advanced 0.092oz) 。 (Wires are not included) 。
3. 32-bit ARM micro processor running at 3.3V/72MHz.
4. With gyro, Magnetometer, and space reserved for Barometer and outer flash(used for recording data) **Note:**
Outer flash space only for SKYline32 Acro version
5. Support Manual mode(not select any flight mode), Angle mode (Angle) , Horizon mode (Horizon) , Heading hold mode (Headadj) , Head-free mode (Headfree) , Altitude hold flight mode (Baro).
Note: Altitude hold flight mode (Baro) only for SKYline32 Advanced & Mini advanced version
6. Support Quad-, Tri-, Hex-, Octo-, various multirotors
7. Support RC input - Standard, CPPM (PPM Sum),and Spektrum.,etc.
8. Battery voltage monitoring and low voltage alarm. **Note: SKYLINE32 MINI version without this function**
9. Built-in FrSky telemetry converter
Note: SKYLINE32 MINI version without this function
10. Support OSD module input. **Note: SKYLINE32 MINI version without this function**

11. Support OLED input **Note: SKYLINE32 MINI version without this function**

12. Onboard Micro-USB for setup and configuration.

13. Cleanflight configuration and Baseflight configuration GUI

14. GPS position hold / return to home

Note: SKYLINE32 hardware is compatible with NAZE32 firmware, including baseflight, cleanflight. Below are the links to the source codes:

<https://github.com/cleanflight/cleanflight>

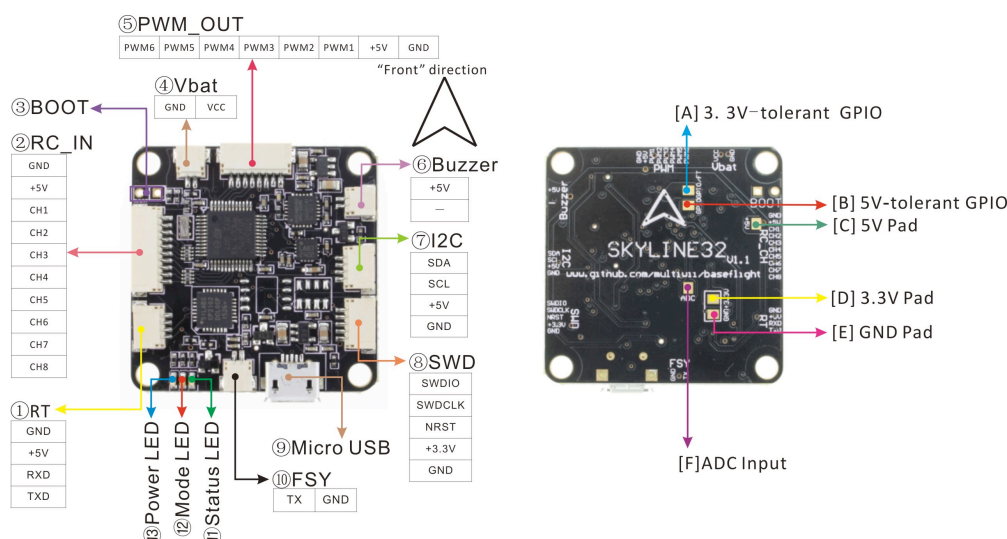
<https://github.com/multiwii/baseflight>

SKYLINE32 is loaded with Cleanflight-Configurator and Cleanflight-Configurator GUI. Parameter adjustment of Baseflight is Baseflight-Configuration. This manual will make basic introduction of these 2 parameter adjustment software. For more, kindly check "<http://yinyanmodel.com/En/DownView.asp?ID=40>"

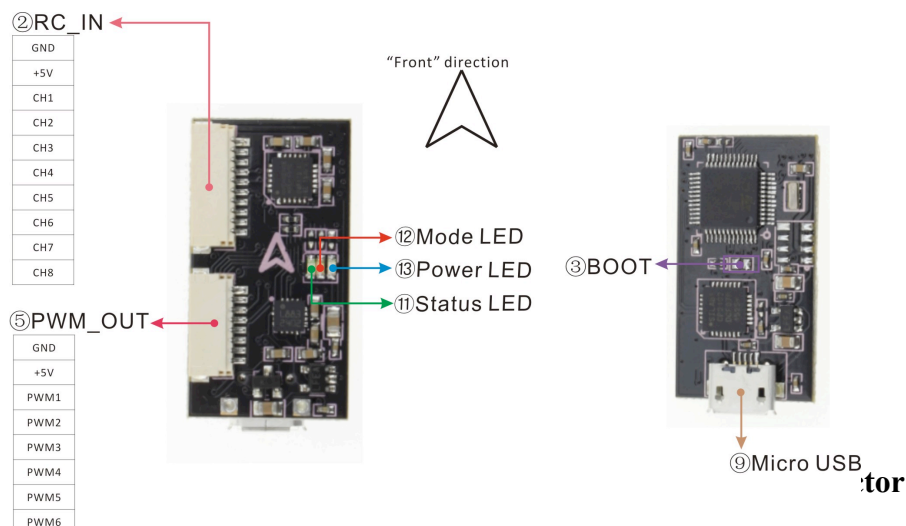
Note: with firmware and configuration based on "MultiWii" software, the processor used is not Atmel AVR, and can not be compiled via Arduino or other AVR tools. Below is some information about STM32 development:

<http://code.google.com/p/afrodevices/wiki/STM32Development>

Hardware And Connection



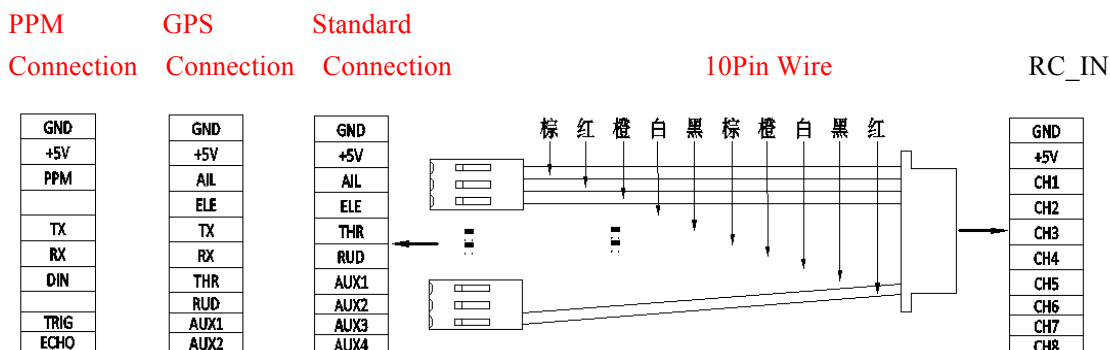
SKYLINE32 Hardware Connector



①Serial communication connector. Used for external serial communication, such as OSD module with serial communication.

②RC Input (PWM/CPPM) / Servo Output / GPS connector.

Default pins order is (from top to bottom): GND, +5V, CH1-CH8. CH1-CH8 for channels: AIL, ELE, THR, RUD, AUX1...AUX4.



When GPS feature is enabled, CH3 and CH4 are used for GPS connection.(CH3:TX, CH4:RX). When using CPPM receiver, these are normally unused, with standard receiver, connect AIL to 1, ELE to CH2, THR to CH5, RUD to CH6, and AUX1/2 to CH7 and CH8.

When using CPPM receiver, CH5 to CH8 can also be used as motor or servo outputs, depending on **airframe** type and configuration.

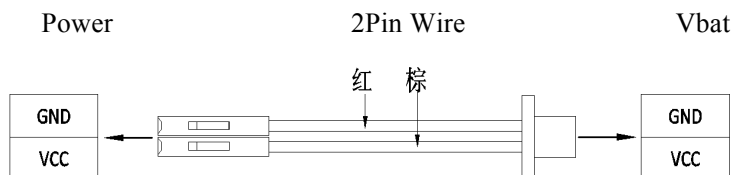
③Bootloader pads: When upgrading firmware,use a forcep to short pads together and power SKYLINE32 on by USB cable.After power LED indicator turns into blue,then remove the short.Firmware updated tool can then be used to reload firmware.

Download source: <http://vinvanmodel.com/En/DownView.asp?ID=39>

④Battery Voltage Monitor: connect this header to battery or power distribution board to enable battery voltage monitoring. Supports Up to 6S LiPo battery. .

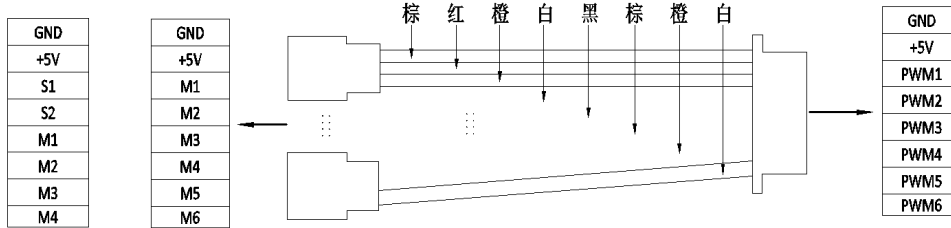
Warning: No reverse polarity protection - connecting battery in reverse will instantly destroy the hardware.

Note: MINI version without this connector



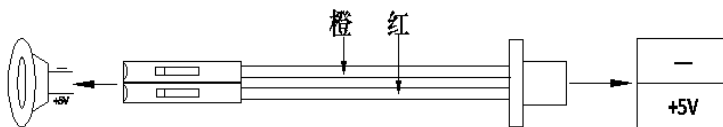
⑤ESC / Servo Headers: From right to left: GND, +5V, PWM1- PWM6. Standard mode: PWM1-PWM6 for ESC input M1-M6; Servo mode: PWM1-PWM6 for servo input S1, S2 and ESC input M1-M4.

Servo Mode Standard Mode 8Pin wire PWM_Out



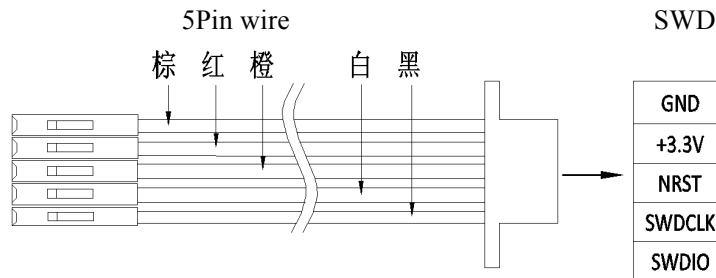
⑥ Buzzer: connect a buzzer here while battery voltage monitor is enabled, buzzer used for a low voltage alarm. Setting battery voltage in Configuration of Parameter adjustment, kindly refer to <http://yinyanmodel.com/En/DownView.asp?ID=40> **Note: MINI version without this connector.**

Buzzer 2Pin wire Buzzer



⑦ I2 Connector: Used for outer I2C communication equipment, such as OLED module. **Note: MINI version without this connector.**

⑧ SWD port: for software modification during software development period. **Note: MINI version without this connector.**



⑨ Micro-USB port: For firmware upgrade and configuration.

⑩ FSY connector: FrSky output, Connect this connector with RxDoF FrSky receiver

Note: MINI version without this connector.

Status LED (Green)。

Mode LED (Red): The LED will be on for the corresponding mode chosen.

Power LED (Blue): LED on when the board is power on.

[A] Withstand voltage 3.3V GPIO port, This pad connected with the STM32 PB5 pin. Can not be connected to 5V voltage, otherwise it will burn the parts **Note: MINI version without such pads.**

[B] Withstand voltage 5V GPIO port, this pad connected with the STM32 PB5. Can be connected to 5V IO port. **Note: MINI version without such pads.**

[C] 5V extended pad, this pad used for RC input & ESC connector, convenient for supply power for other 5v parts **Note: MINI version without such pads.**

[D] 3.3V extended pad. It offer power supply for other low voltage parts, such as spectrum, satellite RC or bluetooth module, etc. **Note: MINI version without such pads.**

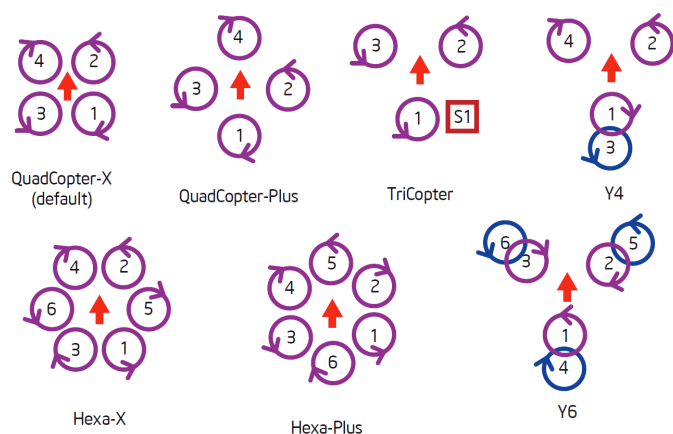
[E] Ground pad. when use 5V and 3.3V extended power for out parts, the out parts could occupy same space with flight controller.

Note: MINI version without such pads.

[F] 3.3V ADC input pad, it is connected with PA5 of STM32 (ADC12_IN5) **Note: This pad with 3.3V, 5V couldn't be**

connected.MINI version without such pads.

Note:Right connection,avoid parts damage.



In above figures, the front of red arrow points to the head of the multirotor; and the arrows in the small circles points to the direction of motor rotation; motor numbers are marked inside the circles; S1 stands for servo; purple motors are top, and blue is bottom.

Note: Configurations with more than 6 motors require CPPM receiver.

Aircraft assembly

Please install flight controller, ESC on your aircraft ,theconnection of FC and the receiver,ffc and ESC connection,kindly refer to the corresponding connection of hardware connection description. Anti shock will be good during the installation. Preferably with a soft double-sided adhesive to increase the damping effect. Avoid vibration of gyro, not causing flight instability.

Parameter Adjustment Installation

1.Program driver installation:



www.emaxmodel.com

Please install the the drive program to your computer if you donot have it already.

(1) Please choose the compatible driver for your computer, link

<http://www.silabs.com/products/mcu/pages/usbtouartbridgevcpdrivers.aspx>

(2) Install the drive program on your computer.

(3) Please switch the ESC switch to ON

(4) Connect flight controller to computer with Micro USB cable

(5) Follow steps to install the driver.

2. Install Configuration Software

(1) Please install Google chrome web browser.

(2) Open Google Chrome web browser, go to "Chrome Web Store" and search BaseFlight - Configurator.

(3) Add " BaseFlight - Configurator" App.

Note: Installing Cleanflight Configurator is similar to Baseflight Configurator, we will not discuss it in this manual

Parameter adjust ment

Cleanflight-Configurator Parameter adjust ment

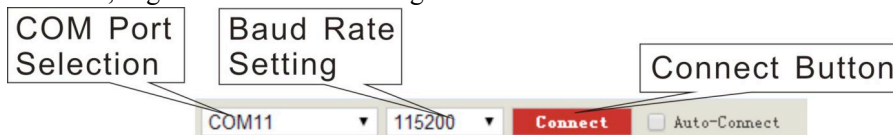
1. Parameter adsjutment and FC connection

(1) Connect flight controller to computer with Micro USB cable, 飞控蓝色电源灯点亮, 同时飞控系统开始自检。自检现象如下:

红绿灯快闪→红灯快闪, 绿灯灭→红灯灭, 绿灯亮, 接着闪烁几次后熄灭(如果此时红灯先熄灭后再常亮, 说明某种飞行模式已经被选择并且有效)→自检完成。

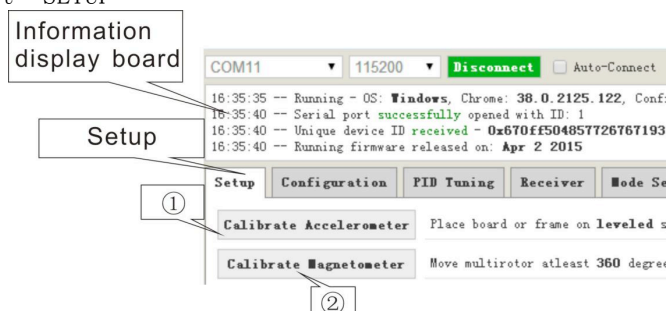
(2) In Cleanflight Configurator App, select COM port and Baud Rate

(3) Click "Connect", flight controller and configurator and connected when the button change to green.



2. Acc & Compass calibration

Please select "SETUP"



① Calibrate Accelerometer

② Calibrate Magnetometer

(1) Calibrate Accelerometer: Place board or frame on leveled surface, then select "Calibrate Accelerometer", once the accelerometer calibration is complete, data will be save automatically. Note: Starting or ending accelerometer calibration will be show in the message display. (Make sure not to move the board or frame during calibration)

(2) Calibrate Magnetometer: Select "Calibrate Magnetometer", make sure to rotate the board or frame 360 degree in all axis within 30sec (rotate axis included: Roll axis, pitch axis and yaw axis). Note: Starting or ending magnetometer calibration will be show in the message display.

3. ESC Calibration

Please make sure to REMOVE PROPELLERS before perform ESC Calibration!

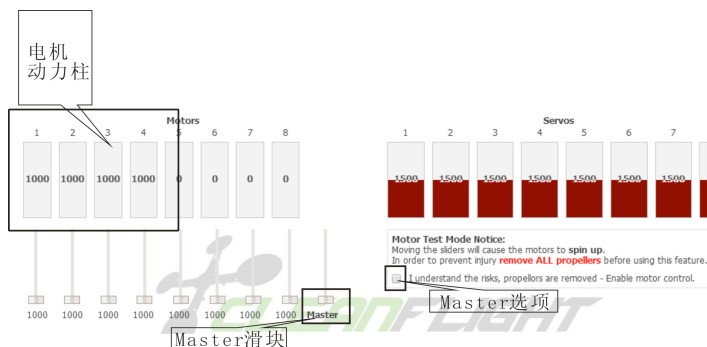
(1) Please select "Configuration", change Maximum Throttle to 2000 and save

(2) Please select "Motor Testing"

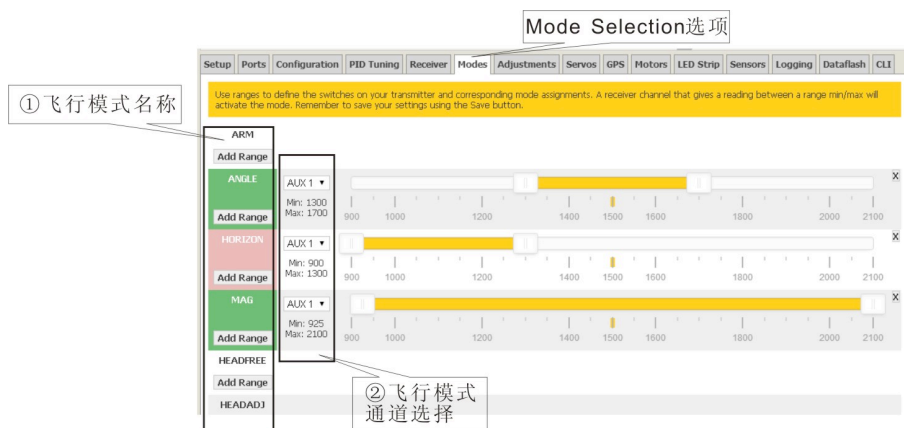
① Please check the box for Motor Test

② Move the master slider to MAXIMUM

Power the ESC on, move throttle quickly slide to the bottom when you hear a confirmation voice , waiting for the completion of the minimum throttle confirmation voice. When the starting voice ends, indicating the ESC calibration is completed.



4. Select Mode



Switching interface into Mode selection.

①Modes: ARM, ANGLE, HORIZON, MAG, HEADFREE, etc. If need to add some mode, need to click "Add Range", while the channel selection drop-down box will be open.

②Channel Select for Modes.

Click "Add Range" button under any mode to flight mode, meanwhile select a channel in drop-down box as channel for mode. Then check the box and save the setting by click "SAVE" at right bottom corner. If the corresponding flight mode of selected channel is active, then when switching to the channels, flight Modes Options screen will highlighted green, other will highlighted red on the screen. Red LED also indicates whether the it is active or not (red light means that the selected flight mode is active). Some models will be based on hardware sensors access situation to decide whether to display, for example, when the hardware without barometer module, which will not show high mode (Baro). Some modes need to be selected at the same time to function correctly.

Thus, the basic set of flight control has been completed, you can fly now.

Baseflight-Configurator Introduction

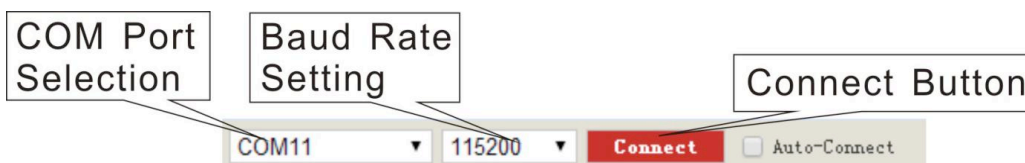
1. Flight Controller and Configurator

(1) Connect flight controller to computer with Micro USB cable, 飞控蓝色电源灯点亮, 同时飞控系统开始自检。 Self test as bellows:

Red green led flashes fast→red led flashes fast→green led off→red led off, green led then flashes a few times then off (if at this time the red light is constantly green after it is off, indicating some kind of flight mode has been selected and valid)→ self check completed

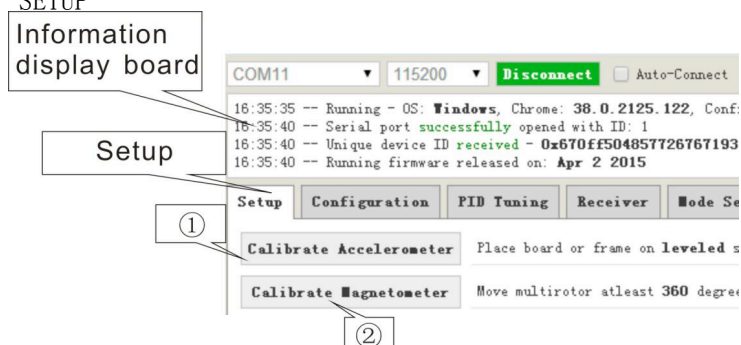
(2) In Baseflight Configurator App, select COM port and Baud Rate

(3) Click "Connect", flight controller and configurator and connected when the button change to green.



2. Accelerometer and Magnetometer Calibration

Please select "SETUP"



① Calibrate Accelerometer

② Calibrate Magnetometer

(1) Calibrate Accelerometer: Place board or frame on leveled surface, then select "Calibrate Accelerometer", once the accelerometer calibration is complete, data will be saved automatically. Note: Starting or ending accelerometer calibration will be shown in the message display. (Make sure not to move the board or frame during calibration)

(2) Calibrate Magnetometer: Select "Calibrate Magnetometer", make sure to rotate the board or frame 360 degrees in all axes within 30 seconds (rotate axes included: Roll axis, pitch axis and yaw axis). Note: Starting or ending magnetometer calibration will be shown in the message display.

3. ESC Calibration

Please make sure to REMOVE PROPELLERS before performing ESC Calibration!

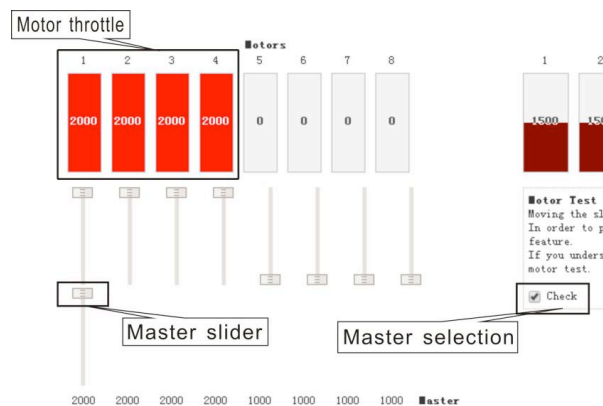
(1) Please select "Configuration", change Maximum Throttle to 2000 and save

(2) Please select "Motor Testing"

① Please check the box for Motor Test

② Move the master slider to MAXIMUM

(3) Power the unit, after the MAXIMUM throttle confirmation sound (BEEP- BEEP-) move the slider to minimum and wait for the MINIMUM throttle confirmation sound (long BEEP----), then you will hear the confirmation of battery cell (if you are using 3 cell battery it will (BEEP-, BEEP-,BEEP), once the unit is ready confirmation sound ("♪ 1 2 3"). ESC calibration is completed.



4. Mode Selections

① Flight Mode

Mode Selection

② AUX Channel Select for Modes

	AUX 1			AUX 2			AUX 3			AUX 4		
	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH	LOW	MED	HIGH
ARM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
ANGLE	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HORIZON	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
MAG	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HEADFREE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
HEADADJ	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
BEEPER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OSD SW	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
AUTOTUNE	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(1) Please select "Mode Selection"

①Modes: ARM, ANGLE, HORIZON, MAG, HEADFREE, HEADADJ, BEEPER, OSD SW, etc... Some modes will not appear unless sensor is connected. Ex: If barometer is not connected to the flight controller, the altitude mode will not display in the list.

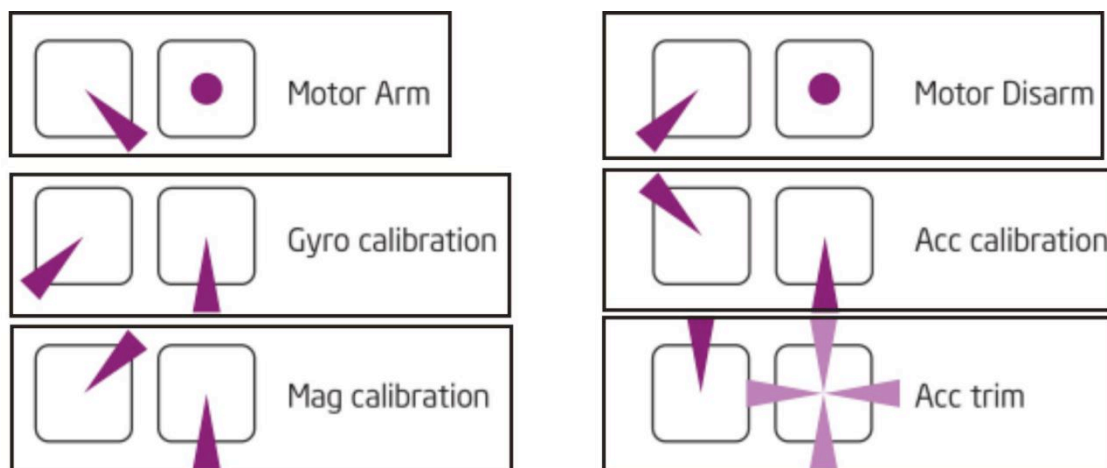
②AUX Channel Select for Modes.

(2) AUX Channel for Modes: Select desired AUX channel for mode, then check the box and save the setting by click the "SAVE" at right bottom corner. When mode is selected by switch the AUX channel, selected mode name will highlighted green, other will highlighted red on the screen.

Red LED (Mode indicator) will lit. Some mode need to be select at the same time to function correctly.

Transmitter Joystick Command (Mode 2 transmitter as example below)

The below chart is stick order of left hand throttle transmitter



If using right hand transmitter, move the stick to the bottom when disarm it, and then move the Yaw axis (direction axis) to max. Move the stick to bottom before locking, then move the Yaw axis to minimum.

Firmware update

有关固件升级的介绍，请到 “<http://vinyanmodel.com/En/DownView.asp?ID=39>” 下载相关文档查看。

For introduction of firmware update, kindly check <http://vinyanmodel.com/En/DownView.asp?ID=39>

Troubleshooting

1. Roll and pitch drifting
 - Recalibrate Acc



www.emaxmodel.com

- Using Acc Trim stick

2. Course shift

- Recalibrate ESC

- Calibrate compass (mag) 。

- Selecting MAG flight mode.